

**MULTIWAVELENGTH  
SEMICONDUCTOR DEVICE**

**OSCILLATING**

**OPTICAL**

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**Abstract**

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**PROBLEM TO BE SOLVED:** To implement stable and simultaneous oscillation of a plurality of different wavelengths without making the structure of an element large, by arranging a semiconductor gain waveguide, which has a plurality of quantum boxes each having a different size within an active region thereof, and a reflecting mirror which has a high reflectance with respect to a plurality of discrete wavelengths, in series with each other.

**SOLUTION:** A semiconductor gain waveguide having a number of quantum boxes 1 to 3 each having a different size within an active region 4 thereof, and a reflecting mirror 5 having a high reflectance with respect to a plurality of discrete wavelengths are arranged in series with each other. As the above-mentioned reflecting mirror 5, a distribution reflecting mirror 5 wherein diffraction gratings, each having a gradually varied pitch, are cyclically formed is used. Further, the quantum boxes 1 to 3 are either quantum boxes 1 to 3 based on a Stranski-Krastanow mode, or quantum boxes 1 to 3 which are self-structured by an atomic layer epitaxy method. The quantum boxes 1 to 3 whose diameters are not uniform are formed at a high density, whereby multiwavelength oscillation can be implemented, and the intensity of multiwavelength oscillation light 8 is improved.